

## KNOCK DOWN DIVAN BASE

This invention relates to a knock down furniture, and in particular a corner post arrangement for securing together panels of a knock down divan bed base or other  
5 item of furniture comprising a corner post secured to adjacent panels.

Knock down furniture provides many advantages in term of packaging, storage and transportation and is extremely popular because of the cost savings involved and also because it allows items of furniture to be assembled in rooms and the like which have  
10 limited access, for example narrow corridors, stairways and doorway apertures which would otherwise prevent furniture being moved into particular rooms and spaces.

There are many examples of knock down bed frames particularly of the slatted frame type in which the head and toe boards are secured to opposite ends of a pair of lateral  
15 side rails by knock down fixings such as bolts, etc. This type of construction readily enables bulky items such as a bed frame to be handled in its knock down form prior to assembly in the room or space where it is required.

Divan bed bases are extremely bulky even in single bed configurations and typically  
20 are produced as two separate components in double bed configurations with the two halves being secured together in use. Knock down bed bases have been proposed including for example the bed base described in WO-A-96/26659. In this earlier published document the bed base comprises a pair of parallel side panels the ends of which are connected by corner posts to the ends of respective parallel end panels to

provide a rectangular box frame structure. In this arrangement a pair of planar top panels for supporting a mattress are positioned on the top edges of the panels. The corner posts extend above the top edges of the panels to provide a corner location feature for the respective corners of the mattress support panels to retain the support panels with respect to the frame. At least one joist extends between the side panels at an intermediate point between the ends thereof so that the mattress support panels are supported at various points along their length. In the arrangement the corner posts comprise a pair of lateral flanges which are separated by a central web inclined at angle 45 degrees to the flanges. The flanges are connected to end panels at the corner position by means of screws or bolts.

The bed base described in WO-A-96/26659 is of particularly robust construction and is suitable for supporting the weight of a water mattress or the like directly on the rectangular frame comprising the side and end panels and intermediate joists. The weight of the mattress is entirely supported by the frame with the corner posts being essentially non-load bearing.

There is a requirement for a divan bed base which is simple in construction and design which is capable of knock down packaging, which provides for low manufacturing and distribution costs and is readily capable of being assembled by unskilled labour using a minimum of tools. There is also a requirement for a corner post arrangement for securing together adjacent panels of other items of furniture, for example upholstered chairs and the like.

According to one aspect of the invention there is provided a knock down divan base for a bed; the said base comprising:

a pair of lateral side panels;

a pair of end panels secured to the ends of the lateral panels by respective  
5 corner posts to provide a rectangular base;

each corner post being secured in interlocking engagement with respective adjacent side and end panels by at least one interlocking brace extending between the adjacent end and side panels.

10 The interlocking nature of the corner post braces provides a light weight rigid frame which is easily assembled. By securing the corner posts in interlocking engagement with the adjacent side and end panels by means of an interlocking brace a readily stiff frame can be achieved. The interlocking braces fix the end and side panels with respect to each other and can prevent distortion of the assembled frame due to relative  
15 movement of the panels when being handled and supporting loads in use.

Preferably, the said at least one brace comprises a mattress support brace for supporting a mattress support panel with respect to the said posts. The mattress support brace is preferably in the form of a flange in a plane perpendicular to both the  
20 longitudinal direction of the corner posts and the plane of the side and end panels. The mattress support braces at each corner of the assembled frame are capable of supporting a mattress support panel and a mattress positioned thereon at the corner posts of the assembled frame.

Preferably the mattress support panel is wholly supported by the mattress support braces. In this way the side and end panels may be substantially non-load bearing with the corner posts bearing substantially the entire weight of the bed including the mattress support panel, mattress and other loads that are placed on the bed. In  
5   embodiments where the side and end panels are substantially non-load bearing the panels may be of relatively light weight construction, for example low cost MDF board or other resin bonded board material.

Preferably, each corner post comprises a location means for locating the post with  
10   respect to the adjacent side and end panels. Such location means may preferably take the form of a plurality of dowels and blind bores formed in the corner post and side and end panel edges. This system of locating the component parts of the knock down base can readily assist in the assembly of the base.

15   In preferred embodiments, the sides and end panels are located in abutting engagement with respective corner posts and preferably in such a way that the outward facing surfaces of the panels and corner posts are substantially flush with one another so that the corner posts provide a smooth transition from one panel to the other.

20   In preferred embodiments, each corner post comprises at least one brace mounting means for mounting a respective brace to the corner post. Preferably, the mounting means comprises a mounting member extending substantially perpendicular to the longitudinal direction of the corner post. Preferably, the mounting member comprises an interlocking slide means for slidably mounting the brace on the mounting member

and moving the brace into interlocking engagement with the adjacent side and end panels. This readily provides for correct alignment of the interlocking brace with respect to the mounting member on the corner post and corresponding interlocking engagement features on the respective side and end panels. By sliding the interlocking  
5 brace on the mounting member of the corner post interference with other interlocking features on the corner post and side and end panels can be avoided as the brace is slid along a pre-determined path into its interlocking engagement position.

In preferred embodiments, the braces further comprise fastening means for securing  
10 the braces to the respective mounting members of the corner posts. The fastening means may comprise typical knock down fixings such as bolts and screws which enable assembly and disassembly of the knock down base. Preferably, the action of tightening the fastening means clamps the respective brace corner post and panel components in such a way that relative movement of the components is substantially  
15 prevented thereby preventing distortion of the frame due to relative movement at the corner posts.

In preferred embodiments the corner posts each comprise a pair of interlocking braces including the hereinbefore mentioned mattress supporting brace at or near one end of  
20 the corner post and a further brace spaced apart from the mattress support brace at or near the other end of the corner post. This further brace may be provided with means for mounting a castor or other like support means for supporting the bed on the floor where it is assembled.

The corner posts, interlocking braces, and side and end panels may be constructed of any suitable material, in preferred embodiments however, the corner posts and interlocking braces are constructed or moulded plastics material, preferably moulded from high impact polystyrene polymer material. In other embodiments the corner  
5 posts may be machined from wood, preferably but not exclusively hard wood according to the desired appearance of the assembled base.

Preferably, the interlocking braces provide a brace of substantially 45 degrees at the corner post locations when mounted on the corner post mounting members between  
10 the respective side and end panels. This provides a symmetrical structure which is equally as strong in both directions, that is to say between the corner post and the respective end panel and the corner post and the corresponding side panel.

According to a further aspect of the invention there is a knock down divan base for a  
15 bed; the said base comprising:

- a pair of lateral side panels;
- a pair of end panels secured to the ends of the lateral panels by respective corner posts to provide a rectangular base;
- the said panels being substantially non-load bearing and the posts supporting  
20 substantially the whole of the bed.

This further aspect of the invention is particularly advantageous in that it provides a knock down base of light weight construction since substantially the entire weight of the bed is supported by the corner posts. In this arrangement the non-load bearing

panels are preferably constructed of light weight materials, for example compressed MDF board or like resin bounded materials.

According another aspect of the invention there is provided a corner post and brace  
5 apparatus for securing together panels of a knock down divan bed base of the type having lateral side and end panels secured together to provide a generally rectangular base for supporting a mattress on a mattress support panel; the said apparatus comprising:

a corner post and a brace for securing the said corner post in interlocking  
10 engagement with respective adjacent end and side panels of a knock down bed foundation base.

The invention also comprehends a knock down bed comprising a base as mentioned above. The present invention also comprehends a kit or part for a knock down bed  
15 foundation base according to any of the above mentioned aspects of the present invention.

According to another aspect of the invention there is a an item of knock down furniture comprising:

20 a pair of lateral side panels;  
a pair of end panels secured to the ends of the lateral panels by respective corner posts to provide a rectangular base;  
each corner post being secured in interlocking engagement with respective adjacent side and end panels by at least one interlocking brace extending between the

adjacent end and side panels.

The present invention also comprehends furniture other than bed bases and in particular comprehends embodiments of other types of knock down furniture, for  
5 example upholstered chairs.

According to another aspect of the present invention there is provided a corner post and brace apparatus for securing together adjacent panels of an item of furniture of the type having side and end panels to provide a generally rectangular support base; the  
10 apparatus comprising:

a corner post; and,

a brace for securing the said corner post in interlocking engagement with respective adjacent end and side panels of an item of furniture.

15 An embodiment of the invention will now be more particularly described, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a perspective view of a part assembled knock down base for a divan bed according to an arrangement of the invention;

20 Figure 2 is a side elevation of a corner post for a knock down base according to the arrangement shown in Figure 1;

Figure 3 is a rear elevation view of the corner post of Figure 2 when viewed in the direction indicated I in Figure 2;

Figure 4 is a plan view of the corner post of Figures 2 and 3 when viewed in



the direction II indicated in Figure 3;

Figure 5 is a plan view of an interlocking brace for interlocking engagement with the corner post of Figures 2-4;

Figure 6 is a front elevation view of the interlocking brace of Figure 5 viewed  
5 in the direction indicated IV in Figure 5;

Figure 7 is a plan cross section view of the corner post of Figures 2-4 and corner post brace of Figures 5 and 6 in interlocking engagement at the corner of a knock down bed base;

Figure 8 is a perspective view of a corner post connected to respective side and  
10 end panels at the corner of a knock down bed base constructed according to the arrangement of Figures 1-7.

Figure 9 is a perspective view of a part assembled corner post and interlocking brace at the corner of a knock down bed base constructed according to the arrangement of Figures 1-7.

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Referring to the drawings in Figure 1 a knock down base for a divan bed is generally indicated at 10 in part assembled configuration. The base comprises a pair of spaced apart parallel side panels 12 and a pair of parallel end panels 14 which are spaced apart so that they extend between the respective ends of the side panels 12. The side  
20 and end panels 12, 14 are designed to be substantially non-load bearing and may be machined from MDF board material or other suitable high strength light weight board material that is well known in the art of furniture manufacture, for example resin bounded materials and the like. The outward facing surfaces of the side and end panels may be covered or coated with a suitable material for example a fabric as is

well known in the upholstery art. The side and end panels are connected together at the corners of the rectangular foundation base by corner posts 16 and interlocking corner post braces 18. In the drawing of Figure 1 only one of the posts can be seen with the corner post braces, the other three posts comprise an identical arrangement to that shown on the post in the upper corner of the drawing. The corner posts and interlocking corner post braces will be described in greater detail with respect to the drawings of Figure 2-8. In the divan bed base of Figure 1, the interlocking brace nearest the top edge of the side and end panels (towards the top of the drawing in Figure 1) provides a support for a mattress support panel 20 which has a shape and size corresponding to the interior surface of the divan base as defined by the side and end panels and corner posts so that the panel 20 is supported at its corners on the upper outward facing surface of the braces nearest the top edge of the panels.

The corner posts are constructed to support substantially the whole weight of the panel 20, mattress and any weight placed thereon, for example the weight of the person or persons on the bed. The corner posts may comprise any suitable material for example high impact moulded polystyrene and the outward facing surfaces of the posts may have a finished appearance, for example a wood effect or other finish as desired. In other embodiments the corner posts may comprise a hard or soft wood material suitable for supporting the weight of the bed or a wood veneer or wood effect laminate may be applied to the outward facing surface.

Referring now to Figures 2-4 and Figure 8, the four corner posts 16 are identical to that shown in the drawings of Figures 2-4 and Figure 8 and have a rounded outer or

exterior surface 22, best seen in Figure 5, and a generally V-shaped interior surface 24 defined by a pair of mutually perpendicular surfaces 24a, 24b. The exterior surface 22 extends over an angle of substantially 90 degrees so that it provides a smooth transition between the respective adjacent end and side surfaces at each corner of the base. The corner post has a dimension in its longitudinal direction which is substantially the same as the depth dimension of the side and end panels of the base. The exterior surface 22 and interior surfaces 24 are joined by respective panel abutment surfaces 26 28 for abutting engagement with respective end and side panels at the corner post position. The surfaces 26 and 28 are substantially perpendicular to the corresponding interior surfaces 24. The abutment surfaces extend along the entire longitudinal length of the corner post and at spaced locations comprise a plurality of blind bores 30 for receiving dowel pins therein (not shown) for location of the corner post with respect to the end and side panels by location of the dowel pins in corresponding blind bores in the panels to be joined to the corner post.

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The post 16 comprises a pair of brace mounting members 32a, 32b which extend generally perpendicular to the longitudinal direction of the post on the interior side thereof from the interior surfaces 24. The first of the mounting members 32a is positioned approximately midway between the top end of the post (at the top of the drawing in Figures 2 and 3) and a mid point on the length of the post. The second mounting member 32b is positioned at the bottom end of the post. As can be seen in the drawing of Figure 3 the mounting members 32a, 32b are generally the same in that they comprise flat top and bottom surfaces 34, 36 and a pair of arcuate (rounded) lateral side surfaces 38, 40 between the top and bottom surfaces. The mounting

members 32a, 32b are themselves braced to the post by means of triangular support flanges 42. A pair of flanges 42 are provided in spaced relation between the lower surface of the mounting member 32a and the interior surfaces 24 and between the upper surface and interior surface 24 on the lower mounting member 32b.

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Referring now to Figures 5-9, each interlocking brace element 18 has a truncated triangular form with a central rectangular cut-out portion 44 which has a shape and size corresponding to that part of the mounting members 32a, 32b which it engages. As will be explained in more detail with reference to Figures 7 and 9 the brace 18 is  
10 slid onto the side surfaces 38, 40 of the mounting member 32a, 32b by engagement with corresponding arcuate lateral side surfaces 46 and 48 on the sides of the cut-out part 44. The cut-out 44 is generally U-shaped with the base of the cut-out comprising a generally flat surface 50 for abutment with the end face 43 of the mounting member.

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As can be more readily seen in Figure 7 the brace 18 and brace mounting member 32a, 32b form an isosceles triangular type geometry when the brace 18 is slid on the mounting member into abutment with the end surface 43 and the interior surfaces of the respective side and end panels 12 and 14. The truncated side surfaces 52, 54 of the  
20 brace 18 are angled with respect to the end surface 56 by 45 degrees so that the surfaces 52 and 54 engage the interior surfaces of the panels 12 and 14 in the assembled configuration as shown in Figure 7. The side surfaces 52, 54 are each provided with a respective cylindrical protrusion member 58 extending perpendicularly from the respective surfaces. The protrusions are truncated on their

side nearest the end surface 56 to prevent interference with the side and end panels on assembly. These protrusions 58 engage in corresponding blind bores 60 machined in the interior surface of the side and end panels.

- 5 The braces 8 are secured to the mounting members 32a, 32b by means of a pair of fastening screws 62 which pass through respective throughbores 64 in the brace from the end surface 56 to the base surface 50 and engage tapped or untapped blindbores 66 in the mounting member 32a, 32b. As can be seen in Figures 7 and 9 the action of tightening the fixing screws 62 causes the brace 18 to slide on the mounting member
- 10 in the direction towards the interior surface of the corner post so that the side protrusions 58 enter the blind bores 60 in the side and end panels, and on further movement of the bracket on the mounting member cause the protrusions to engage the side surfaces of the bores 60 to urge the side and end panels into abutting engagement with the respective end surfaces 26 and 28 when the bracket is moved to its final
- 15 position where the base surface 50 engages the end surface 43 of the mounting member. In the installed configuration shown in Figure 7 the upward facing surfaces of the mounting member and bracket 18 are substantially flush with one another and provide a substantially flat surface for mounting the mattress support panel 20. The lower mounting member 32b and corresponding brace 18 provide for further clamping
- 20 of the end and side panels to the corner post 16 at the opposite end of the corner post and also provide a means by which a floor contact support such as a castor or the like can be mounted to the corner post.

Although aspects of the invention have been described with reference to the

embodiment shown in the accompanying drawings it is to be understood that the invention is not limited to this precise embodiment and that various changes and modifications may be effected without exercise of further inventive skill and effort. For example the furniture item to which the present invention is applied may comprise  
5 any item of furniture, particularly upholstered furniture in which a corner post is to be connected to two adjacent panels, for example in an upholstered chair where the corner post provides a main structural component of the chair.